Oak Ridge Associated Universities, Oak Ridge Institute for Science and Education

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
October 24-27, 2011

U.S. Department of Energy
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Foreword

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided, but not standardized. For this reason, on January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration (OSHA) VPP. Since its creation by OSHA in 1982 and implementation by DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. The Office of Health, Safety and Security (HSS) assumed responsibility for DOE-VPP in October 2006. HSS is expanding complex-wide contractor participation and coordinating DOE-VPP efforts with other Department functions and initiatives, such as Enforcement, Oversight, and the Integrated Safety Management System.

DOE-VPP outlines areas where DOE contractors and subcontractors can surpass compliance with DOE orders and OSHA standards. The program encourages a *stretch for excellence* through systematic approaches, which emphasize creative solutions through cooperative efforts by managers, employees, and DOE.

Requirements for DOE-VPP participation are based on comprehensive management systems with employees actively involved in assessing, preventing, and controlling the potential health and safety hazards at their sites. DOE-VPP is available to all contractors in the DOE complex and encompasses production facilities, laboratories, and various subcontractors and support organizations.

DOE contractors are not required to apply for participation in DOE-VPP. In keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, any participant may withdraw from the program at any time. DOE-VPP consists of three programs with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star program is the core of DOE-VPP. This program is aimed at truly outstanding protectors of employee safety and health. The Merit program is a steppingstone for participants that have good safety and health programs, but need time and DOE guidance to achieve true Star status. The Demonstration program, expected to be used rarely, allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Merit or Star program.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of employees at the site. The symbols of this recognition provided by DOE are certificates of approval and the right to use flags showing the program in which the site is participating. The participant may also choose to use the DOE-VPP logo on letterhead or on award items for employee incentive programs.

This report summarizes the results from the evaluation of the Oak Ridge Institute for Science and Education during the period of October 24-27, 2011, and provides the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding its participation in DOE-VPP.

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ABBREVIATIONS AND ACRONYMS

ARRA	American Reinvestment and Recovery Act
ATDD	Atmospheric Turbulence and Diffusion Division
Be-LPT	Beryllium Lymphocyte Proliferation Test
BLS	Bureau of Labor Statistics
CBT	Computer-Based Training
CFR	Code of Federal Regulations
cpm	Counts Per Minute
DART	Days Away, Restricted, or Transferred
DOE	Department of Energy
ES&H	Environment, Safety and Health
FMS	Facility Maintenance Section
GET	General Employee Training
HF	Hydrofluoric Acid
HSS	Office of Health, Safety and Security
IEAV	Independent Environmental Assessment and Verification
JHA	Job Hazard Analysis
MMC	Methodist Medical Center
NAICS	North American Industry Classification System
NOAA	National Oceanic and Atmospheric Administration
OR	Oak Ridge Office
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PRWC	Physical Requirements and Working Conditions
RCM	Radiological Control Manual
RCT	Radiological Control Technician
RPP	Radiation Protection Program
SCATS	Safety Corrective Action Tracking System
SSR	Site Safety Representative
Team	DOE Office of Health, Safety and Security VPP Team
TRC	Total Recordable Case
VPP	Voluntary Protection Program
VPPPA	Voluntary Protection Program Participants' Association

EXECUTIVE SUMMARY

The Oak Ridge Institute for Science and Education (ORISE) is a Department of Energy (DOE) institute located in Oak Ridge, Tennessee. ORISE is managed for DOE by Oak Ridge Associated Universities (ORAU), a nonprofit research and training organization sponsored by more than 101 doctorate granting universities in the United States. ORISE has approximately 950 full-time employees working at ORISE and 350 undergraduate, graduate, and post-doctoral employees working at the Oak Ridge National Laboratory (ORNL). Additionally, ORAU appoints research participants to full-time positions at national laboratories across the country. ORISE's mission is to address national needs in the: (1) assessment and analysis of the environmental and health effects of radiation, beryllium, and other hazardous materials; (2) development and operation of medical and national security radiation emergency management and response capabilities; and (3) management of educational programs to help ensure a robust supply of scientists, engineers, and technicians to meet future science and technology needs. ORISE creates opportunities for collaboration through partnerships with other DOE facilities, other Federal Agencies, academia, and industry in a manner consistent with DOE objectives and the ORISE mission. In December 2003, ORISE was certified as a DOE Voluntary Protection Program (VPP) Star site, and recertified in April 2008. The DOE Oak Ridge Office manages the ORISE contract for DOE's Office of Science and has oversight responsibility.

Continuation of Star status in DOE-VPP requires an onsite review by the DOE Office of Health, Safety and Security VPP team (Team) every 3 years. The Team conducted its review from October 24-27, 2011, to determine whether ORISE continues to perform at a level deserving DOE-VPP Star recognition. The review included the main campus in Oak Ridge, the south campus on the outskirts of Oak Ridge, the Atmospheric Turbulence and Diffusion Division Laboratory, and interviews with employees at a variety of remote locations. The purpose of this report is to document the results of the Team's review and provide the Chief Health, Safety and Security Officer with the necessary information to make the final decision about ORISE's DOE-VPP status.

Based upon discussions and interviews with over 100 workers, supervisors, and managers, as well as extensive observation of field activities, inspection of worksites and facilities within the project scope and review of records, the Team determined that ORISE has maintained a strong emphasis on worker safety and health.

ORISE has effectively continued its dedication and commitment to the pursuit of safety excellence. That commitment was evident throughout the organization. ORISE has implemented and maintained several initiatives to increase employee involvement and provide effective safety training to all employees. ORISE outreach and mentoring efforts to support and encourage expansion of DOE-VPP are noteworthy. Opportunities for improvement identified in 2008 were readily accepted and acted upon to further strengthen an excellent program. Outreach to post-doctoral students assigned to ORNL, identified as a risk in 2008, has been significantly expanded with communication and outreach activities occurring frequently. Some vulnerabilities were identified related to the radiation protection program, primarily related to the rigor applied to the program. Although radiological hazards are low, training and qualifications for radiation protection technicians and radiation workers should be more systematically implemented and documented.

Consistent with the standard for Star status that managers and workers are dedicated to and effectively pursuing excellence in safety performance, the Team identified a number of opportunities for improvement. Listed in Table 1, these opportunities for improvement require no formal corrective action plan, but they should be considered and addressed by ORISE in conjunction with its ongoing efforts for continuous improvement. The Team strongly recommends that ORISE continue to participate in DOE-VPP at the Star level.

TABLE 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
ORISE should continue reviewing existing operations with the new hazard analysis process, focusing on hazards associated with the facility or equipment being used, and ensure the logical alignment between the identified hazards and the selected controls are justified and captured.	**11**
ORISE should work with ORNL to ensure both the students and ORISE receive inspection or sampling results related to potential workplace hazards to which the students may be exposed.	**11**
ORISE should ensure that radiological control decisions are properly reviewed by radiological control personnel and then documented in work packages or permits.	**15**
ORISE should evaluate the tritium counter's settings, ensure training for laboratory personnel performing tritium monitoring includes an understanding of the efficiency counter setting, and ensure that training is documented.	**15**
ORISE should evaluate its radiological postings and ensure postings are adequately visible prior to entry into those areas.	**15**
ORISE should modify its survey forms to include conversion from cpm to disintegrations per minute per 100 square centimeters, and ensure personnel performing surveys are trained to perform that conversion.	**16**
ORISE should revise its calibration program to ensure consistency and accuracy of calibration stickers on portable and laboratory instruments and reduce worker confusion.	**16**
ORISE should consider performing an internal assessment of RPP by its very experienced radiological personnel in the IEAV program as a means of identifying further improvements to RPP.	**17**
ORISE should review its radiological training processes to ensure qualification requirements are clearly documented, records of training and qualification are maintained and retrievable, and qualifications of personnel from other organizations are validated.	**20**

I. INTRODUCTION

The Department of Energy (DOE) Voluntary Protection Program (VPP) onsite review of the Oak Ridge Associated Universities (ORAU) at the Oak Ridge Institute for Science and Education (ORISE) was conducted October 24-27, 2011.

ORISE is a DOE institute located in Oak Ridge, Tennessee. ORISE is managed for DOE by ORAU, a nonprofit research and training organization sponsored by more than 101 doctorate granting universities in the United States. ORISE has approximately 950 full-time employees working at ORISE and 350 undergraduate, graduate, and post-doctoral employees working as research participants at the Oak Ridge National Laboratory (ORNL). Additionally, ORISE appoints research participants to full-time positions at National Laboratories across the country. ORISE's mission is to address national needs in the: (1) assessment and analysis of the environmental and health effects of radiation, beryllium, and other hazardous materials; (2) development and operation of medical and national security radiation emergency management and response capabilities; and (3) management of education programs to help ensure a robust supply of scientists, engineers, and technicians to meet future science and technology needs. ORISE creates opportunities for collaboration through partnerships with other DOE facilities, other Federal Agencies, academia, and industry in a manner consistent with DOE objectives and the ORISE mission. In December 2003, ORISE was certified as a DOE-VPP Star site. ORISE completed its first recertification in April 2008, and this assessment marks its second recertification. The DOE Oak Ridge Office (OR) manages the ORISE contract for DOE's Office of Science and has oversight responsibility.

Located in Oak Ridge Tennessee, ORISE has consolidated into two campuses. The main campus consists primarily of office space. The south campus, located off Bethel Valley Road near ORNL, has office and laboratory space. Three primary laboratories are located at the south campus: the Beryllium Laboratory; the Biodosimetry Cytogenetics Laboratory; and the Radiochemistry Laboratory. ORISE is also the landlord for the Atmospheric Turbulence and Diffusion Division (ATDD) of the National Oceanic and Atmospheric Administration (NOAA), which has a laboratory in Oak Ridge. The ATDD laboratory performs research directed toward issues of national and global importance in the areas of air quality, contaminant dispersion, and climate. Finally, ORISE has personnel located around the country performing contract work to universities, commercial industry, and other Government Agencies.

Recognition in DOE-VPP requires an onsite review by the Office of Health, Safety and Security (HSS) DOE-VPP team (Team) to determine whether the applicant is performing at a level deserving DOE-VPP Star recognition. The Team evaluated ORISE safety programs against the provisions of DOE-VPP. During the site visit, the Team observed activities, evaluated relevant safety documents and procedures, and conducted interviews to assess the strength and effectiveness of ORISE's health and safety programs.

During the review, the Team had contact with approximately 100 personnel, including students, managers, and laboratory, maintenance, and office personnel. Activities included observation of preventive and corrective maintenance activities, student safety briefings, walkdowns of shop areas, inspection of teaching laboratories, review of documents (such as procedures and job

hazard analyses (JHA)), and both formal and informal interviews with workers and managers. Hazards encountered by workers are generally low, consisting primarily of standard office hazards (e.g., ergonomic hazards, office equipment, parking lots), as well as hazards associated with analytical laboratory work. Additionally, some workers are exposed to other environmental hazards associated with field work, such as insects, poisonous plants, and potential radiological and chemical exposures associated with cleanup sites.

II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

Table 2.1 Injury Incidence/Lost Workdays Case Rate (ORISE)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Rate	Days Away, Restricted, or Transferred (DART) Cases	DART Case Rate
2008	1,387,327	1	0.14	1	0.14
2009	1,528,610	6	0.79	1	0.13
2010	2,214,639	4	0.36	0	0.00
3-Year Total	5,130,576	11	0.43	2	0.08
Bureau of Labor Statistics (BLS-2010) average for NAICS * Code # 5419 (Other professional, scientific, and technical services)			5.7		1.9

Table 2.2 Injury Incidence/Lost Workdays Case Rate (Subcontractor)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART Cases	DART Case Rate
2008	17,880	0	0.00	0	0.00
2009	17,332	1	11.54	1	11.54
2010	51,294	0	0.00	0	0.00
3-Year Total	86,506	1	2.31	1	2.31
Bureau of Labor Statistics (BLS-2010) average for NAICS * Code # 5419 (Other professional, scientific, and technical services)			5.7		1.9

*North American Industry Classification System

Total Recordable Case Incidence Rates, including subcontractors: 0.46
Days Away, Restricted, or Transferred Rates, including subcontractors: 0.12

Conclusion

ORISE is showing a slight upward trend in recordable cases from 2008 (0.1) to October 2011 (.56). This rise comes from several sources, including an increase in the hazards encountered by workers as ORISE began performing more characterization work for environmental restoration activities, and an increasing willingness by workers to report minor injuries. ORISE continues to work on removing hazards and increase worker awareness of hazardous conditions, and the rates remain a small fraction of the comparison industry rates (90 percent below). Further, regular reviews of the Occupational Safety and Health Administration (OSHA) 300 logs by OR ensure that all injuries are appropriately classified. Although the 3-year average rates for subcontractors are above the national average, those rates are driven by a single case in the last 3 years. ORISE accident and injury rates continue to meet the expectations for a DOE-VPP Star participant.

III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture. The contractor must demonstrate senior-level management commitment to occupational safety and health, in general, and to meeting the requirements of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. As with any other management system, authority and responsibility for employee health and safety must be integrated with the management system of the organization and must involve employees at all levels of the organization. Elements of that management system must include: (1) clearly communicated policies and goals; (2) clear definition and appropriate assignment of responsibility and authority; (3) adequate resources; (4) accountability for both managers and workers; and (5) managers must be visible, accessible, and credible to employees.

As in 2008, ORAU continues to demonstrate exemplary support for safety at ORISE. Opportunities for improvement identified in the 2008 DOE-VPP assessment were not only accepted, but were adopted with enthusiasm by the management team. Resources for improvements were provided in terms of additional staff, expanded rewards and recognition, and were effectively used to improve analysis of tasks and hazards. Those resources are seen as an investment and a competitive advantage for ORISE. The outreach to post-doctoral students and employees at ORNL is an exemplary program, and managers universally agreed that it was becoming a critical program to influence the safety culture in academia, as well as at ORISE. This was particularly relevant in light of events in the past 2 years where students at academic institutions have suffered severe injuries or fatalities due to unsafe attitudes and practices at colleges and universities. ORISE is clearly on the forefront of improvements being called for by various academic and research-oriented organizations.

Responsibility for safety is distributed throughout the organization and appropriate policies and procedures remain in effect. The environment, safety and health (ES&H) staff was expanded in 2008 to provide more effective industrial hygiene, emergency management, and environmental management support. The improvements identified from the 2008 assessment to establish and maintain a baseline exposure assessment and improved hazard analysis were effective, and the commitment to those improvements was notable.

ORISE managers continue to support creative and entertaining methods of communicating safety. The annual safety calendar has grown in participation by family members, with over 40 family members submitting safety slogans and artwork for the 2011 calendar. Smaller recognition and reward programs have been implemented and used to good effect throughout the organization.

ORISE continues to support and foster community involvement in safety through the Oak Ridge Business Safety Partnership. Each year, ORISE has sponsored key speakers on relevant safety topics. In the past 3 years, topics have included the DuPont Safety Model, Human Performance Improvement, and Safety Culture Models. These presentations were praised by local businesses as reaching out to ingrain the safety culture into the community.

In response to the 2008 assessment, ORISE has sent a broad range of personnel to the regional and national Voluntary Protection Program Participants' Association (VPPPA) conferences. The attendees' efforts have been coordinated to ensure they attend sessions relevant to ORISE and actively bring new ideas back to Oak Ridge. For example, the roof access improvements discussed in Hazard Prevention and Control resulted from maintenance personnel attending the VPPPA National Conference in 2010.

ORISE has also instituted strategic planning processes to ensure efforts to achieve and maintain excellence in safety and health are sustained. Managers recognize that ORISE in recent years has managed, through its commitment to excellence and quality, to maintain and grow its business lines by approximately 40 percent since 2008. The additional resources from the American Reinvestment and Recovery Act (ARRA) provided opportunities to expand existing capabilities and reach out to new customers. With the ARRA funding drawing to a close, ORISE is working to ensure that if reductions become necessary in the coming months and years, those reductions will not sacrifice worker safety and health improvement initiatives. Managers clearly believed efforts to achieve and maintain safety and health excellence provided ORISE with a distinct competitive advantage that needed to be maintained, particularly in leaner economic conditions.

Conclusion

ORISE managers continue to effectively support and lead the workforce in improving the safety culture. Additional resources have been provided and safety and health excellence is recognized as a strategic advantage. Managers are quick and persistent in ensuring that safety concerns are addressed in a timely manner. They are clearly committed to the continuous improvement and excellence that are hallmarks of continued DOE-VPP participation at the Star level.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels must continue to be involved in the structure and operation of the safety and health program and in decisions that affect employee health and safety. Employee involvement is a major pillar of a strong safety culture. Employee participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices. Managers and employees must work together to establish an environment of trust where employees understand that their participation adds value, is crucial, and welcome. Managers must be proactive in recognizing, encouraging, facilitating, and rewarding workers for their participation and contributions. Both employees and managers must communicate effectively and collaboratively participate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

ORISE employees are actively engaged in the safety and health programs. The Team's review of the program documents and information collected from interviews with the employees indicated that the management has fully empowered employees to participate in the safety and health programs. It was evident during interviews that the employees are motivated about the company's position on building a safe work environment and taking safe working habits home. The ORISE Occupational Health Office provides many opportunities to participate in wellness activities throughout the year. Examples include brown bag lunches, guest speakers, news line articles and audio clips, blood screenings, and the Annual Safety Fair.

Employees clearly demonstrated their ability to obtain ES&H information from the "Safety 1st" Web site that serves as a primary means of safety communication at ORISE. The Safety 1st Web site has excellent safety and health information, including a wide variety of timely and pertinent topics for workers to review and share.

The Safety Council is the main safety committee at ORISE. It has its own charter, chair, co-chair, and management sponsor, and meets monthly to address ES&H issues. Meeting minutes demonstrate that the meetings are well attended and ES&H issues brought to the meeting are addressed in a timely manner.

ORISE has approximately 40 primary and alternate Site Safety Representatives (SSR). These personnel represent a specific building, area, or program. They serve voluntarily and are responsible for their assigned area and to perform quarterly assessments, using a standard checklist. If identified issues cannot be closed immediately, they are entered into the Safety Corrective Action Tracking System (SCATS) for tracking and closure. Issues identified in SCATS over the past few years were all properly closed out and the employee raising the issue was informed of the outcome. There is an established SSR charter with training and orientation for all SSRs. Refresher SSR training is required annually. A formal SSR turnover process is established to ensure appropriate information is transferred from outgoing SSRs to successors. They are also required to attend bimonthly SSR and Safety Council meetings. Interviews with employees and managers indicated that SSRs serve as a critical interface between the employees and the managers and have the trust of the employees and managers' support. All of the employees and managers interviewed by the Team stated that they rely on SSRs to promote safety and address safety issues.

Employees interviewed by the Team know their SSR and get feedback from them about the Safety Council meetings or from the Safety 1st Web site. SSRs receive additional training and serve as a conduit for addressing employee safety concerns by the Safety Council. The employees were able to provide examples of recent safety issues raised that were addressed and corrected soon after they were identified or within a reasonable period of time (60 days for items requiring facility modification, otherwise 30 days).

Employees clearly understood their rights under title 10, Code of Federal Regulations, part 851 (10 CFR 851), to take time out or stop work if they saw a situation involving an imminent danger to themselves or others. They also understood this authority was a responsibility and stated that they would not hesitate to exercise it without fear of reprisal. The employees also stated that they would report all injuries to their supervisors regardless of how minor the injuries were.

A major function of ORISE is the placement of undergraduate, graduate, doctorate, and post-doctoral research students in laboratories throughout the country. These students, most of whom are post-doctoral students, are ORAU employees that work under the supervision of mentors at various laboratories. For example, approximately 350 students work at ORNL under ORNL mentors and follow ORNL policies and procedures. The 2008 Team observed that these students were somewhat disengaged from the ORISE safety and health training programs and were unfamiliar with VPP and related activities. The 2008 Team challenged ORISE to find innovative ways to engage the students in ORISE VPP activities. ORISE has taken several steps to address this challenge. It has held "ORISE Service Fairs" that provided VPP materials, hosted "Guest Researcher Safety Luncheons" to increase awareness of VPP, and sends safety newsletters to them. ORISE publishes a monthly newsletter that discusses points of interest for the students and also includes items, such as the various cultural events in the Knoxville/Oak Ridge area. The Occupational Medicine staff visits ORNL to meet with students on a weekly basis and is available to discuss issues or concerns with the students or to provide medical support. Because the students are colocated at ORNL, special emergency event cards have been prepared for them that instruct them on how to respond to events at ORNL and to ensure ORISE is aware of these events and can responsibly respond to them.

A New Employees Services Fair is held every 6 months and attendance is mandatory for new personnel. Current personnel are encouraged to attend as well. The Fair consists of representatives from human resources, safety, and occupational medicine, to name a few. The representatives discuss benefits, timesheet preparation, immigration issues, travel, and other issues important to newly arrived personnel. The fair also holds presentations related to seasonal topics, such as winter driving, and also discusses topics of interest based on employee suggestions. For example, many of the post-doctoral students come from other countries and are unfamiliar with local insects, animals, and plants. Consequently, they have expressed great interest in learning more about these to be able to identify potential hazards.

Most post-doctoral students attend the service fairs and safety luncheons to learn about the ORISE safety programs and to meet the ORISE support staff. The ORISE SSR at ORNL technically represents only the ORISE administrative support staff, but the SSR has taken the

initiative to reach out to the students to the extent that all students interviewed by the Team indicated that having a separate SSR to represent them would be unnecessary.

Another positive step taken by ORISE is to require students to complete the "Physical Requirements and Working Conditions Assessment Form" and undergo a mandatory physical before beginning work. Students interviewed by the Team clearly demonstrated that they are now familiar with ORISE-VPP and have a strong safety culture. The students were clear in their belief that they would take their safety concerns to their mentors, as well as the SSR.

Employees at all levels believe a positive and safe work environment exists in office and field environments, including construction. The office workers, as well as the laboratory personnel and craftsmen, indicated they are comfortable raising safety and health concerns to their supervisors and managers. Employees also indicated that they participate in the resolution of the concerns they raise.

Conclusion

Employee ownership is strongly rooted across the ORISE organization. ORISE has taken significant steps to encourage the students working through ORISE at ORNL to fully participate in VPP. The students are now fully engaged in VPP. All employees, including the students, believe that ORISE managers fully support participation in safety committee activities and safety awareness campaigns. The employees are encouraged to promote safety at work and at home. Managers and employees have worked together to develop lines of communication to identify and promote safety and health responsibilities and eliminate hazardous conditions. ORISE meets the requirements of the Employee Involvement tenet of DOE-VPP at the Star level.

V. WORKSITE ANALYSIS

Management of health and safety programs must begin with a thorough understanding of all hazards that might be encountered during the course of work and the ability to recognize and correct new hazards. There must be a systematic approach to identifying and analyzing all hazards encountered during the course of work, and the results of the analysis must be used in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that are encountered and include a system to ensure that new or newly recognized hazards are properly addressed. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of such hazards.

In 2008, the Team identified a weakness with the ORISE baseline exposure assessment process. ORISE took several actions at the time to implement a more systematic process that thoroughly evaluated hazards and ensured records were maintained. That process identified some hazards that had not been adequately addressed, and ORISE made several improvements (see Hazard Prevention and Control). ORISE continues to maintain that hazard baseline process and documentation. Its hazards remain low and it continually looks for new or changed hazards. ORISE evaluates all work through a systematic process based on the OSHA approach to hazard analysis contained in OSHA Pamphlet 3071, *Job Hazard Analysis*.

During the 2008 assessment, the Team identified an opportunity to improve the hazard analysis process. The ORISE process did not effectively capture the analysis that justified the selection of controls for the identified hazard. ORISE added a section to the JHA to more effectively capture the rationale for control selection. In some cases, as a result of improvements to the analysis, ORISE identified additional controls. For example, ORISE reviewed laboratory usage of Hydrofluoric Acid (HF) and found that not only were laboratory workers exposed to the potential hazard, the employees in the shipping and receiving department could potentially be exposed to the hazard if the shipping containers were damaged. The ES&H department provided HF hazard training to the shipping and receiving employees and provided calcium gluconate gel in the warehouse to immediately begin treatment should an HF exposure occur.

ORISE is one of three laboratories nation-wide that performs the Beryllium Lymphocyte Proliferation Test (Be-LPT) to determine if workers have become Beryllium sensitized. One of the other laboratories has experienced extensive repetitive motion injuries. Recognizing a potential increase in sample processing and desiring to prevent similar problems, ORISE performed a workflow analysis in the Beryllium Laboratory. It discovered several ergonomic issues and instituted corrective actions to prevent repetitive motion injuries. For example, rather than have an individual perform the same task all day, such as pipetting samples, they rotate tasks through the laboratory during the course of the workday. They changed the workflow from start to finish, eliminating awkward sample transfers. Workers pointed out that long pipette tubes with the triggering mechanism at the top caused them to assume an awkward position over the samples. Workers identified a new system using shorter pipettes with the trigger located at the bottom. ORISE also purchased new ergonomic chairs for use in the laboratory to prevent worker fatigue.

During practice exercises, ORISE recognized that impaired or incapacitated employees needed assistance to evacuate during emergency conditions. ORISE analyzed options to evacuate employees that require assistance, and then strategically placed wheelchairs within key facilities. ORISE also invited the Oak Ridge Fire Department to visit and walkthrough facilities with the approved pre-fire plan to familiarize fire department personnel with the hazards.

ORISE is the landlord for several buildings assigned to the ATDD division of NOAA. During the 2008 assessment, the Team noted very poor housekeeping that could inhibit egress or lead to injuries during emergency evacuations. ORISE ES&H personnel worked with ATDD personnel to identify safe egress routes and keep those routes clear through periodic inspections.

In the past, many personnel throughout ORISE offices used electric space heaters during cold weather to provide a more comfortable work environment. Recognizing the potential for increased fire hazards, ORISE evaluated the use of electric space heaters throughout its facilities. Where possible, maintenance personnel adjusted the office heating and ventilation system to eliminate the need for space heaters. In some cases, ORISE provided low wattage foot warmers where medically justified to reduce the hazard.

A major capital improvement for ORISE since 2008 has been the construction of a new building to house a Californium-252 source. Californium-252 produces a high energy neutron field that is used for production of minute amounts of short-lived isotopes. ORISE uses these isotopes for training purposes. The health physics department participated in the hazard analysis and planning for moving the Californium-252 source to the new facility. Health physics professionals evaluated the dose from the source on contact and recommended appropriate controls that included shielding and remote tools to transfer the source. ORISE incorporated these recommendations into a mockup that workers used to practice the job steps. As a result of these controls and practice, workers received no measurable dose when transferring the source.

JHAs and other work documents reviewed by the Team were generally adequate and contained the appropriate material. ORISE has produced many high-quality JHAs since 2008. Some of the documents reviewed during this assessment had minor deficiencies. For example, a work package, used by the independent verification organization, to sample and characterize equipment and systems in building 3503 indicated the need to monitor for volatile organic compounds and combustible gasses. In the safety concerns section of the document, chemicals, fumes/mists, or toxic material were not identified as potential hazards; and potential sources, locations, expected amounts, or potential consequences were not analyzed.

In a few cases, ORISE has used the JHA to only document previously identified controls rather than as an opportunity to critically analyze the hazards. For example, the JHA for fork truck operation includes a step to *Mount the truck.* Controls listed for the step are: (1) maintain sufficiently safe clearances for aisles and at loading docks or passages where forklifts are used; (2) do not handle loads that are heavier than the weight capacity of the forklift; and (3) ensure that the operator wears a seatbelt installed by the manufacturer. Another step is *Start the truck and elevate forks.* Identified controls for that step are: (1) keep floors clean and free of slip and trip hazards; and (2) install ergonomically designed driver's seat. Although these controls are fundamentally correct, the controls have little applicability to the work steps. In a JHA for using

the milling machine, the first step is to *visually inspect* the machine for physical condition; there are no hazards or controls identified. A critical analysis might have identified a hazard of missing machine guards or damaged equipment, might have identified the need for the operator to be trained and qualified to conduct the visual inspection, or a list of key components that needed to be inspected. In another JHA for using a belt sander, the first step is *visually check the machine for physical condition.* There are no hazards identified; however, the controls offered are as follows: (1) use the sander (both belt and disk) appropriate to the job; (2) use safety glasses; and (3) use caution to keep hand away from the contact point of work. Each of these cases indicates that personnel performing the hazard analysis were probably trying to fit existing controls for the task into the JHA work steps rather than perform more critical hazard analysis.

In some cases, hazard analyses that focus on the sample method have not included hazards associated with the sample processing equipment. For example, a soil sample analysis process was observed. One step in the process involves heating the soil in a platinum bowl with a Bunsen burner to 1,000 degrees Celsius for approximately 20 minutes. During that time, workers in the laboratory may be performing other operations, or even leave the immediate area of the laboratory hood. Workers recognized that the Bunsen burner sometimes gets blown out and listen for a change in the sound to alert them. The hazard analysis for the hood did not include any analysis of the potential for gas from an unlit burner to reach the lower flammability limit or the lower explosive limit in the hood exhaust, nor had controls to stop or limit the flow of gas to an unlit burner been considered. ORISE should continue reviewing existing operations with the new hazard analysis process, focusing on hazards associated with the facility or equipment being used, and ensure the logical alignment between the identified hazards and the selected controls is justified and captured.

Opportunity for Improvement: ORISE should continue reviewing existing operations with the new hazard analysis process, focusing on hazards associated with the facility or equipment being used, and ensure the logical alignment between the identified hazards and the selected controls are justified and captured.

The program to place students in positions at ORNL still represents a potential vulnerability to ORISE because ORISE has no effective means to confirm hazards are being identified and controlled in the ORNL environment where the students work. ORISE has no authority to evaluate the ORNL work areas, nor is ORISE provided results of the evaluations, assessments, or inspections conducted by ORNL to ensure a safe working environment. ORISE should work with ORNL to ensure both the students and ORISE receive inspection or sampling results related to potential workplace hazards to which the students may be exposed.

Opportunity for Improvement: ORISE should work with ORNL to ensure both the students and ORISE receive inspection or sampling results related to potential workplace hazards to which the students may be exposed.

ORISE tracks and trends a variety of information. Data collected and analyzed include: injury/illness cases (type, location, severity); inspection results (type, location, root cause); workers' issues; quarterly radiological dosimetry data; training (Rad Worker, Hazwoper,

bloodborne pathogens, Cardio Pulmonary Resuscitation/Automated Electronic Defibrillator, Emergency Preparedness, etc.); first-aid cases; patient visits (both work-related and nonwork-related); return to work (both work-related and nonwork-related); and fitness for duty (both work-related and nonwork-related). Using this data, ORISE identified several improvements. For example, during emergency drills, personnel could not evacuate one building quickly because all personnel were trying to use the same exit. ORISE personnel evaluated the issue and determined that by directing personnel through different exits, depending on where they reside in the building, bottlenecks could be avoided and evacuation could be accomplished faster. In 2008, ORISE identified hand injuries as an area for improvement based upon body location and severity analysis of injury and first-aid cases. Since 2008, ORISE focused on the issue and dramatically reduced the injuries through training and awareness campaigns.

Conclusion

ORISE facilities generally contain low hazards that are well understood by a mature workforce. Most of the work performed is within a laboratory environment with engineering controls and processes that are procedurally driven. The improvements in the JHA process now allow the analysis to be captured and documented. The next challenge for ORISE is to ensure the hazard analysis is correct and complete and justifies the identified controls. Opportunities for improvement identified in this section will help ensure knowledge gained through the hazard analysis process is captured and retained for future reference. ORISE continues to improve and meets the expectations at the Star level in the Worksite Analysis tenet.

VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (by substitution or changing work methods) or addressed by the implementation of effective controls (engineered controls, administrative controls, or Personal Protective Equipment (PPE)). Equipment maintenance processes to ensure compliance with requirements and emergency preparedness must also be implemented where necessary. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. These rules and procedures must also be followed by everyone in the workplace to prevent, control the frequency of, and reduce the severity of mishaps.

ORISE employs engineered controls, specifically fume and chemical hoods, as the primary method to limit employee exposure to laboratory hazards. The laboratory areas observed by the Team had appropriate engineered controls to minimize potential employee exposures. In anticipation of an increase in laboratory operations in the Be-LPT laboratory, ORISE performed a comprehensive workflow analysis in conjunction with a focus on ergonomic issues. The review resulted in several improvements to equipment used in the hoods and elsewhere in the laboratory. In other laboratories, ORISE installed new fume hoods with digital flowrate meters on the outside of the hoods to monitor airflow. These new hoods and airflow meters enable laboratory personnel to verify proper airflow when moving the sash.

During interviews, workers described accessing the roof on several of the ORISE buildings. Roof access involved climbing a fixed ladder and "man-handling" the hatch open from the ladder. Upon opening the hatch, the workers would have to grip and climb over the six inch steel roof hatch apron. Hatch use became particularly hazardous when workers had to climb down into the hatch. Wet boots would slip easily on the fixed metal ladder creating additional risk to workers. Workers saw a solar powered roof access hatch with integrated handrails demonstrated at the 2010 VPPPA National Conference and recommended that ORISE install them in four buildings that required routine roof access. Workers praised the new hatch systems as being safer and easier to use. The new system allowed the worker to open the hatch with a switch at the base of the ladder. The worker then climbs the ladder and uses the permanent handrails installed with the hatch system to climb off the ladder onto the roof. The handrails on the roof also serve as fall protection by preventing workers from inadvertently stepping into, or near, the open hatch while working on the roof.

In situations where engineered or administrative controls cannot effectively eliminate or control the hazards, PPE is used. The Team observed personnel wearing gloves, face shields, laboratory coats, booties, substantial footwear, hearing protection, or other protective equipment while performing their daily tasks. Hazards typically requiring use of PPE included hazardous chemicals, small quantities of radioactive material, heated surfaces, noise, energized circuits, sharp implements, cryogenic materials, and pinch points. ORISE effectively used baseline exposure assessments, job-specific JHAs, and established procedures to identify and implement PPE requirements. In 2008, the Team identified that gloves selected for use with HF handling were not recommended for HF use and did not appropriately protect workers. ORISE conducted an analysis of those operations, and identified gloves (silver tech gloves) that provide improved protection for any work involving HF.

The Facility Maintenance Section (FMS) in the Facilities and Transportation Department operates the preventive maintenance program for ORISE. Maintenance work is performed using established maintenance procedures. Work that is determined to be beyond the FMS skill set is performed by qualified subcontractors. All subcontractors must comply with ORISE safety programs. For subcontracted work expected to require more than 100 hours, the subcontractor must provide a work safety plan that is then evaluated and approved by ORISE.

ORISE maintains a database for preventive maintenance requirements. The database is a simple design that does require additional work steps by FMS personnel to finalize the work plan, but based on the level of activity in the preventive maintenance program, the system appears to be adequate for current needs. There is a possibility that because the software used to maintain the database is old, it may not be supported in the future. ORISE may wish to consider upgrading the system to a more comprehensive system to reduce personnel time involved in tracking and closing preventive maintenance actions and preclude software support issues.

ORISE has on-staff safety professionals who provide expertise in industrial safety, industrial hygiene, and radiation protection, and safety professionals who provide assistance and review when needed or requested. Qualified and experienced craftsmen also assist in oversight of subcontracted workers when their particular expertise is applicable. Since the 2008 review, ORISE has added an industrial hygienist and a radiological technician to bolster its ES&H staff. Workers interviewed by the Team were satisfied that they were obtaining adequate support.

Site emergency preparedness activities, including site-wide alarm tests, are conducted per DOE Order 151.1C, *Comprehensive Emergency Management System*. Fire and police protection are provided by the City of Oak Ridge. Drills conducted in the past year included evacuation, shelter-in-place, or personal injury scenarios. Since the 2008 review, ORISE has improved its emergency preparedness program. The Oak Ridge region frequently experiences the threat of tornados, and several times in the past year ORISE initiated shelter-in-place actions. ORISE recognized the significance of these events and has expanded its emergency preparedness program to improve communication to workers. For example, ORISE initiated a real-time weather monitoring system alert for all employees and has Weatherbug® notifications forwarded immediately to all site safety representatives who then assist in implementing emergency responses in their assigned areas. ORISE is also working to extend that notification to all workers on a real-time basis. The ORISE emergency response team invited the Oak Ridge Fire Department to tour the site, discuss potential hazards onsite, and review the site's pre-fire plan.

ORISE was also concerned that employees might leave the site in a weather event and drive into worse conditions on the way home. As a result of that concern, ORISE developed a third party emergency information Web site for notifying employees about current weather conditions and site status. Workers can access the Web site from their homes or work locations. This Web site is particularly helpful in providing workers with weather notifications for not only the ORISE site but also for their home areas.

ORISE has a radiation protection program (RPP) based on the requirements of 10 CFR 835, *Occupational Radiation Protection*. The Team observed well-understood, low-level radiological

hazards and sufficient controls for activities. All personnel who potentially encounter or access radiological areas or materials are monitored for exposure through the site dosimetry program. The ORISE RPP identifies three areas for radiological control: Independent Environmental Assessment and Verification (IEAV); Beryllium/Tritium in the Be-LPT laboratory; and the professional training programs.

Radiological controls associated with IEAV work were effective. The Team reviewed survey work conducted at ORNL and noted that PPE (scrubs, booties, and gloves) had been upgraded due to discovery of unexpected radiological contamination at a previous survey location at ORNL. The additional PPE was prescribed by an industrial hygienist, and ORISE personnel stated that the upgrade in PPE was discussed with the Radiological Control Department. That discussion was not documented in the hazard analyses or radiological work permits. ORISE should ensure that radiological control decisions are properly reviewed by radiological control personnel, and then documented in work packages or permits.

Opportunity for Improvement: ORISE should ensure that radiological control decisions are properly reviewed by radiological control personnel and then documented in work packages or permits.

The Be-LPT test uses small quantities of tritiated thymidine as a tracer. PPE for tritium work included laboratory coats and gloves. Laboratory personnel monitor contamination levels daily on selected areas at the end of the shift and survey the floor area monthly. ORISE radiological control personnel also monitor the Be-LPT laboratory floor on a monthly basis. This approach is consistent with the ORISE Radiological Control Manual (RCM), *section 9.5.2,* to ensure that workspaces are maintained free of contamination. The training received by laboratory personnel for the surveys was informal and not documented. For example, the Team noted that the daily efficiency verification for the tritium counter indicated that, although within ORISE established tolerance, the instrument's efficiency counter was lower than what is expected. ORISE should evaluate the tritium counter's settings, ensure training for laboratory personnel performing tritium monitoring includes an understanding of the efficiency counter setting, and ensure that training is documented.

Opportunity for Improvement: ORISE should evaluate the tritium counter's settings, ensure training for laboratory personnel performing tritium monitoring includes an understanding of the efficiency counter setting, and ensure that training is documented.

The Team observed several weaknesses associated with some radiological postings. In a few cases, the Team observed postings and labeling that was not visible; i.e., behind an open door or underneath material, which had been left on top of the labeling or was not readily apparent; i.e., above doorways. ORISE should evaluate its radiological postings and ensure postings are adequately visible prior to entry into those areas.

Opportunity for Improvement: ORISE should evaluate its radiological postings and ensure postings are adequately visible prior to entry into those areas.

Radiological surveys reviewed by the Team did not always identify the personnel performing or reviewing the survey. Some survey results had the same individual performing the survey and reviewing the survey. Other surveys had no review. By documenting who performed the survey, and ensuring a different qualified person reviews the results, ORISE will add additional rigor to its radiological control program, and reduce the likelihood of contamination spread or worker exposure.

The Team also noted radiological surveys with results specified in counts per minute (cpm). The 10 CFR 835 contamination limits are in units of disintegrations per minute per 100 square centimeters. Comparison of survey results to 10 CFR 835 limits requires additional analysis of survey results that accounts for detector efficiency and specific isotopes of concern. Without performing and documenting this analysis, ORISE cannot effectively evaluate survey results against the 10 CFR 835 requirements. ORISE should modify its survey forms to include conversion from cpm to disintegrations per minute per 100 square centimeters, and ensure personnel performing surveys are trained to perform that conversion.

Opportunity for Improvement: ORISE should modify its survey forms to include conversion from cpm to disintegrations per minute per 100 square centimeters, and ensure personnel performing surveys are trained to perform that conversion.

The Team identified some opportunities to improve the radiological instrument calibration process. Although calibration records reviewed by the Team were current, in some cases labels and stickers on the instruments did not accurately reflect that status. For example, the tritium counter used by the Radiological Control organization had a calibration sticker attached indicating that calibration was required last summer although records indicated the counter's calibration was current. Also, some field instruments had two calibration stickers indicating calibration due dates which differed by 6 months. The IEAV group performs the electronic calibration for the Radiological Control instruments every 6 months. The Radiological Control group then performs a source calibration of its instruments annually. Both groups attach calibration due dates to calibrated instruments. The use of two calibration stickers with differing calibration expiration dates can be confusing to workers using the instruments. ORISE should revise its calibration program to ensure consistency and accuracy of calibration stickers on portable and laboratory instruments and reduce worker confusion.

Opportunity for Improvement: ORISE should revise its calibration program to ensure consistency and accuracy of calibration stickers on portable and laboratory instruments and reduce worker confusion.

ORISE has a DOE-approved RPP. The 10 CFR 835 requires that "the content of each RPP shall be commensurate with the nature of the activities performed…" In its efforts to ensure that RPP is commensurate with the nature of activities performed, ORISE developed a simplified RPP.

However, this simplified RPP does not specifically address all the requirements in 10 CFR 835. Instead, the ORISE RPP has some general discussion on such topics as design considerations or As Low As Reasonably Achievable. ORISE has a matrix of the 10 CFR 835 requirements that was prepared at the request of OR to demonstrate how each requirement in 10 CFR 835 is met, but that matrix is not part of the RPP, either by attachment or reference. Further, the matrix is not a controlled document, nor has it been entered into any document control system.

The ORISE RCM contains more specific implementing procedures and expectations. That manual is not identified, referenced, or attached to the RPP. The RCM provides direction on implementing the ORISE RPP, but it does not provide detailed information on how to conduct several fundamental radiation protection activities, such as how to conduct a survey, how to document surveys, how to calibrate or response check instruments, or how to post and label radiological areas and containers of radioactive material. The RCM frequently uses nonspecific wording for directing actions, such as "routinely test instruments for operability" or "conduct a survey if contamination levels are expected to exceed limits." The RCM also has some technical errors that could lead to noncompliance with other DOE requirements. For example, section 18.5.1.2 of the RCM discusses release of equipment without restriction and refers to appendix D of the RCM. Appendix D only refers to the 500 disintegrations per minute per 100 cm^2 limit in 10 CFR 835 for transuranic surface contamination to release equipment. Per 10 CFR 835, that value only applies to release into a controlled area. Further, that value far exceeds the requirements of DOE Order 458.1, *Radiation Protection of the Public and the Environment*. Use of an incorrect value for transuranic surface contamination could lead to a release of property above DOE-prescribed limits. Finally, the RCM has several references to appendix B of the manual, but there is no appendix B in the RCM.

These discrepancies in ORISE Radiological Control program indicate the rigor applied to RPP may not reflect the excellence seen in other aspects of the ORISE health and safety program. ORISE should consider performing an internal assessment of RPP by its very experienced radiological personnel in the IEAV program as a means of identifying further improvements to RPP.

Opportunity for Improvement: ORISE should consider performing an internal assessment of RPP by its very experienced radiological personnel in the IEAV program as a means of identifying further improvements to RPP.

Methodist Medical Center (MMC) HealthWorks provides all medical services for ORISE, including acting as the medical director, providing medical surveillance, maintaining medical records, and providing medical evaluation and other medical-related activities. The medical director is physically located at MMC in Oak Ridge, but two registered nurses are located onsite, one on the main campus and the other on the south campus, and are routinely available for staff assistance or consultation. The nurse located on the southern campus meets weekly at ORNL with the ORISE-sponsored, post-doctoral students working at ORNL.

The ORISE Occupational Medicine program is very active. Occupational Medicine initiatives are well-received and supported by managers. Initiatives, such as the "Spring into Wellness" program, which sponsored a variety of health-related issues for employee education, was held in

the spring of 2011. Three hundred employees attended the "Spring into Wellness" program this year.

Occupational medical personnel also promote "brown bag lunches" in which they present a variety of safety topics to attending employees during their lunch hour. Topics vary widely from winter driving, safe driving techniques, and, most recently, to a focused discussion about breast cancer awareness.

Physical Requirements and Working Conditions (PRWC) forms are prepared for all employees by input from the workers' supervisor and the nurses and are updated annually or when an employee changes work activities. The PRWC's address potential hazards a worker may experience during their work, including those that may require an employee to participate in a medical-monitoring program.

Occupational medical personnel provide mandatory physicals for those employees involved in any work requiring medical monitoring, such as work involving lead, asbestos, or formaldehyde exposure. Occupational medical personnel also offer voluntary physicals to all ORISE employees annually, which include a free electrocardiogram, prostate-specific antigen test, and chest x-rays. Employee response to the voluntary physicals has been positive and nearly 40 percent of the employees have participated.

First aid and initial evaluations of injuries are conducted by onsite nurses. If they determine further evaluation is required, employees are referred to the MMC HealthWorks in Oak Ridge. MMC HealthWorks also performs the preemployment and return-to-work physicals.

ORISE is self-insured for its health insurance. By supporting the Occupational Medicine group's initiatives and encouraging the occupational medical staff's availability for nonwork-related concerns, ORISE has leveraged its medical resources and significantly reduced its health insurance costs. This has been translated into reduced health insurance premiums for workers participating in the ORISE health insurance plan and increased worker satisfaction with the health insurance program.

Conclusion

Hazards at ORISE are well controlled. ORISE employs an appropriate range of engineered and administrative controls, and PPE to minimize its workers' exposure to hazards. The vulnerabilities identified in the RPP should be addressed by a more systematic approach to requirements. Workers clearly demonstrated an ability to conduct work safely and an effective awareness of hazards. The ORISE medical program is an excellent example of how an active Occupational Medicine program can reduce injury and illness for a participant. ORISE meets the expectations of a Star participant in Hazard Prevention and Control.

VII. SAFETY AND HEALTH TRAINING

Managers, supervisors, and employees must know and understand the policies, rules, and procedures established to prevent exposure to hazards. Training for health and safety must ensure that responsibilities are understood, personnel recognize hazards they may encounter, and they are capable of acting in accordance with managers' expectations and approved procedures.

ORISE training and qualification programs are well-established to ensure that all ORISE and subcontractor employees receive appropriate training to recognize hazards of work environment to protect themselves and coworkers. The training process is systematic and provides requisite knowledge, skills, and abilities to perform tasks competently and safely. It applies to all employees and all aspects of ORISE operations, design, procurement, construction, and support activities.

ORISE has processes in place that formally define the required training and assures completion for employees, supervisors, and managers/directors commensurate with their job descriptions, responsibilities, and authorities. Most training at ORISE continues to be computer-based training (CBT). All employees have online access to their training records and review their upcoming training. Interviews with the employees indicated that they find CBT user-friendly, comprehensive, effective, and contains modules that are both informative and easy to understand.

All new employees are required to take the initial General Employee Training (GET), and the current employees must take the GET refresher biennially. A good practice used by ORISE is the new employee mentoring program. New employees are not permitted to perform work at the site until the mentors are satisfied that the new employees are able to work independently. For example, a newly hired janitorial worker is guided by an experienced janitor and the same is true for the laboratory workers and students who are guided by their mentors.

Most hazard recognition training for employees is focused on the office environment because the majority of ORISE employees are office workers. Hazard recognition training is also provided to other employees, such as laboratory staff, maintenance workers, and students based on their work environment and duties. Managers and supervisors take all of the hazard recognition and safety and health training required of their workers and may receive additional training in safety, operations, and security depending on their workscope.

The managers prepare the training plans for new and reassigned employees using the CBT selection tool. They also prepare PRWC forms in consultation with the employee, industrial hygienist, and industrial safety staff using standard templates available for each job category. PRWC and employee training plans are updated annually. Each department has a training point of contact who schedules the training identified in the training plans and medical evaluations required by PRWC. The training coordinators check the training status of employees monthly and inform the employees of the upcoming training 60 days and 30 days before the training is scheduled. In case of past due training, the manager is notified so that the employee is not assigned to jobs for which the training has expired.

Radiation safety training records for some workers are incomplete, out of date, or nonexistent. ORISE does not currently have a systematic method to track training status for radiological workers or Radiological Control Technicians (RCT). One list maintained by the training staff showed several individuals whose radiation worker qualifications had expired. Further investigation showed that list had not been updated to reflect recent training, and the workers were actually current in their qualifications. For several workers, radiological worker training performance demonstrations required by 10 CFR 835 had not been recorded. RCT qualification is currently based on the individual's resume, completion of a core fundamentals training class, or the individual presenting a core completion certificate from other training organizations, such as local community colleges. Those core completion certificates are not controlled or issued by ORISE or DOE. While DOE encourages establishment of reciprocity agreements for radiological training, such agreements require some assurance that the training is acceptable. ORISE has not established that surety. ORISE should review its radiological training processes to ensure qualification requirements are clearly documented, records of training and qualification are maintained and retrievable, and qualifications of personnel from other organizations are validated.

Opportunity for Improvement: ORISE should review its radiological training processes to ensure qualification requirements are clearly documented, records of training and qualification are maintained and retrievable, and qualifications of personnel from other organizations are validated.

Training completion records are maintained in an electronic system using an Oracle® database. While the records can be accessed by the training coordinators and employees, the database must be queried to prepare the list of employees whose training is expiring in the next 60 or 30 days. ORISE is upgrading the training records system to directly send e-mail notification to employees when their training is due, and to provide qualification and training lists to supervisors and managers. The new system called Oracle Learning Management System is scheduled to be operational in January 2012.

With the exception of radiological training, other training documentation and interviews with employees indicated that training is being carried out in a thorough and systematic manner. The employees interviewed were well aware of hazards, knowledgeable of controls, and properly trained for the tasks they were performing.

Conclusion

ORISE has a well-established training and qualification program that ensures workers are appropriately trained to recognize hazards and protect themselves and coworkers. The ORISE training program helps managers, supervisors, and employees understand the established safety and health policies, rules, and procedures to promote safe work practices and minimize exposure to hazards. ORISE should establish a more systematic process for tracking and maintaining radiological training and qualifications. ORISE continues to meet the requirements of the Safety and Health Training tenet of DOE-VPP at the Star level.

VIII. CONCLUSIONS

ORISE is showing a slight upward trend in recordable cases from 2008 (0.1) to October 2011 (.56), which is primarily attributable to an increase in the hazards encountered by workers as ORISE began performing more characterization work for environmental restoration activities, and an increasing willingness by workers to report minor injuries. The rates remain a small fraction of the comparison industry rates (90 percent below) and regular reviews of the OSHA 300 logs by OR ensure that all injuries are appropriately classified.

ORISE managers continue to effectively support and lead the workforce in improving the safety culture and are clearly committed to the continuous improvement and excellence in safety and health. Similarly, employee involvement in the safety and health program is accepted as an essential element of mission success. Steps to encourage the students working through ORISE at ORNL have been effective in fostering the students' participation and setting an example to colleges and universities for incorporating safety into academic pursuits. Improvements in the hazard analysis processes have resulted in improved hazard controls throughout the organization. Vulnerabilities in the radiological protection program should be addressed by a more systematic approach to requirements. A well-established training and qualification program ensures workers are appropriately trained to recognize hazards and protect themselves and coworkers, and with identified improvements will ensure training and qualification requirements are more clearly documented and tracked.

Overall, ORISE continues to demonstrate a high level of commitment and success in establishing an excellent safety and health program. The Team strongly recommends that ORISE continue to participate in DOE-VPP at the Star level.

APPENDIX A

Onsite VPP Assessment Team Roster

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